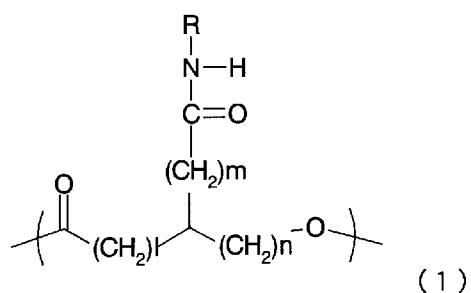


B. Claims

The following is a complete listing of the claims, and replaces all earlier versions and listings.

1. (Currently Amended) A polyhydroxyalkanoate ~~characterized in that the polyhydroxyalkanoate comprises~~comprising one or more units represented by the chemical formula (1) in a molecule:



wherein R represents $-\text{A}_1-\text{SO}_2\text{R}_1$;

wherein R_1 is selected from the group consisting of OH, a halogen atom, ONa, OK and OR_{1a} ;

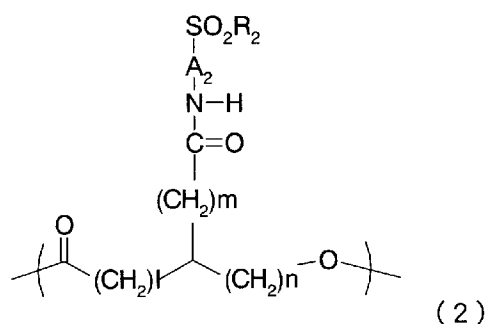
wherein R_{1a} and A_1 independently represent a group having a substituted or unsubstituted aliphatic hydrocarbon structure, a substituted or unsubstituted aromatic ring structure or a substituted or unsubstituted heterocyclic structure, respectively;

wherein l is an integer selected from 1 to 4, n is an integer selected from 1 to 4, and m is an integer selected from 0 to 8; and

wherein when two or more units are present, R, R_1 , R_{1a} , A_1 , l, m and n ~~mean~~

~~as above~~ are selected independently for ~~every~~ each unit.

2. (Currently Amended) The polyhydroxyalkanoate according to claim 1 ~~characterized in that the polyhydroxyalkanoate comprises~~ comprising one or more units selected from ~~those represented by the group consisting of~~ chemical formula (2), ~~the~~ chemical formula (3), ~~the~~ chemical formula (4A) ~~or the~~ and chemical formula (4B) in a molecule as a unit of the chemical formula (1)



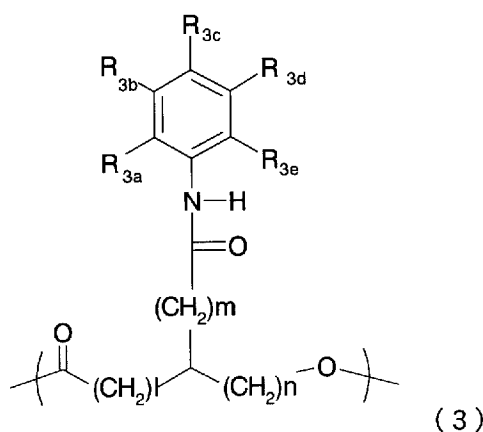
wherein R_2 is selected from the group consisting of OH, a halogen atom, ONa, OK and OR_{2a} ;

wherein R_{2a} is a linear or branched alkyl group having 1 to 8 carbon atoms or a substituted or unsubstituted phenyl group;

wherein A_2 represents a linear or branched alkylene group having 1 to 8 carbon atoms;

wherein l is an integer selected from 1 to 4, n is an integer selected from 1 to 4 and m is an integer selected from 0 to 8; and

wherein when two or more units are present, A_2 , R_2 , R_{2a} , l , m and n ~~mean as~~
~~above~~are independently selected for ~~every~~each unit[[]];

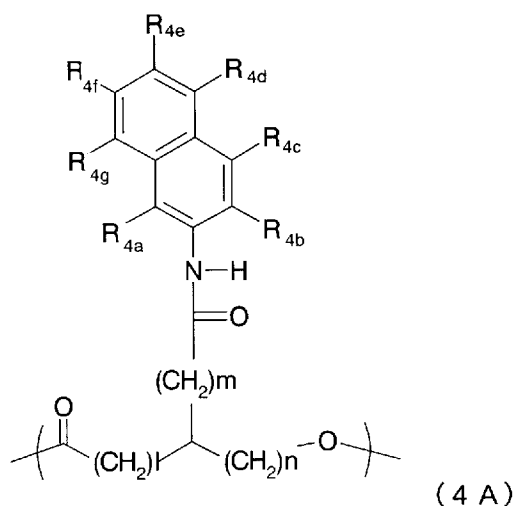


wherein R_{3a} , R_{3b} , R_{3c} , R_{3d} and R_{3e} are, independently, SO_2R_{3f} , wherein R_{3f} is selected from the group consisting of OH, a halogen atom, ONa, OK and OR_{3f1} , wherein OR_{3f1} is a linear or branched alkyl group having 1 to 8 carbon atoms or a substituted or unsubstituted phenyl group; a hydrogen atom,; a halogen atom,; an alkyl group having 1 to 20 carbon atoms,; an alkoxy group having 1 to 20 carbon atoms,; OH-group, NH_2 group,; NO_2 -group,; $COOR_{3g}$ -group, wherein R_{3g} represents any of H-atom,; Na-atom and K-atom; an acetamide group,; OPh-group,; NHPh-group,; CF_3 -group,; C_2F_5 -group,; or C_3F_7 -group, wherein Ph represents a phenyl group, respectively,; and at least one of R_{3a} , R_{3b} , R_{3c} , R_{3d} and R_{3e} ~~these groups~~ is SO_2R_{3f} ;

wherein l is an integer selected from 1 to 4, n is an integer selected from 1 to 4, and m is an integer selected from 0 to 8; and

wherein when two or more units are present, R_{3a} , R_{3b} , R_{3c} , R_{3d} , R_{3e} , R_{3f} , R_{3f1} ,

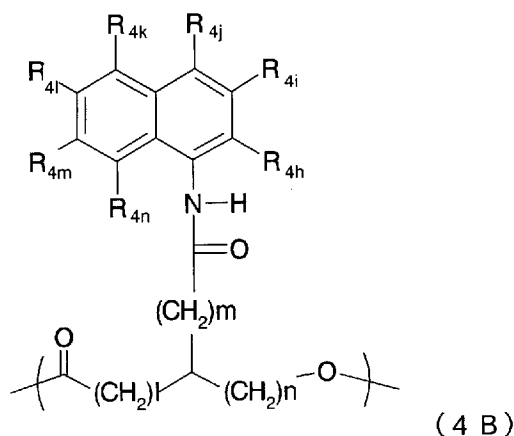
R_{3g} , and l, m and n ~~mean as above~~ are independently selected for ~~every~~each unit;



wherein R_{4a} , R_{4b} , R_{4c} , R_{4d} , R_{4e} , R_{4f} and R_{4g} are, independently, SO_2R_{4o} , wherein R_{4o} is selected from the group consisting of OH, a halogen atom, ONa, OK and OR_{4o1} , wherein OR_{4o1} is a linear or branched alkyl group having 1 to 8 carbon atoms or a substituted or unsubstituted phenyl group; a hydrogen atom, a halogen atom, an alkyl group having 1 to 20 carbon atoms, an alkoxy group having 1 to 20 carbon atoms, OH group, NH_2 group, NO_2 group, $COOR_{4p}$ group, wherein R_{4p} represents any of H-atom, Na-atom and K-atom; an acetamide group, OPh-group, NHPh-group, CF_3 -group, C_2F_5 group, or C_3F_7 -group, wherein Ph represents a phenyl group, respectively, and at least one of R_{4a} , R_{4b} , R_{4c} , R_{4d} , R_{4e} , R_{4f} and R_{4g} ~~these groups~~ is SO_2R_{4o} ;

wherein l is an integer selected from 1 to 4, n is an integer selected from 1 to 4, and m is an integer selected from 0 to 8; and

wherein when two or more units are present, R_{4a} , R_{4b} , R_{4c} , R_{4d} , R_{4e} , R_{4f} , R_{4g} , R_{4o} , R_{4ol} , R_{4p} , and l , m and n ~~mean as above~~ are independently selected for ~~every~~ each unit;

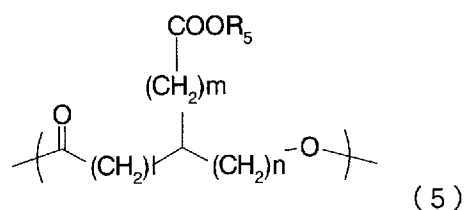


wherein R_{4h} , R_{4i} , R_{4j} , R_{4k} , R_{4l} , R_{4m} and R_{4n} are, independently, SO_2R_{4o} , wherein R_{4o} is selected from the group consisting of OH, a halogen atom, ONa, OK and OR_{4ol} , wherein OR_{4ol} is a linear or branched alkyl group having 1 to 8 carbon atoms or a substituted or unsubstituted phenyl group; a hydrogen atom; a halogen atom; an alkyl group having 1 to 20 carbon atoms; an alkoxy group having 1 to 20 carbon atoms; OH group; NH_2 group; NO_2 group; $COOR_{4p}$ group, wherein R_{4p} represents any of H-atom, Na-atom and K-atom; an acetamide group; OPh group; NHPH group; CF_3 group; C_2F_5 group; or C_3F_7 group, wherein Ph represents a phenyl group, respectively, and at least one of R_{4h} , R_{4i} , R_{4j} , R_{4k} , R_{4l} , R_{4m} and R_{4n} ~~these groups~~ is SO_2R_{4o} ;

wherein l is an integer selected from 1 to 4, n is an integer selected from 1 to 4, and m is an integer selected from 0 to 8; and

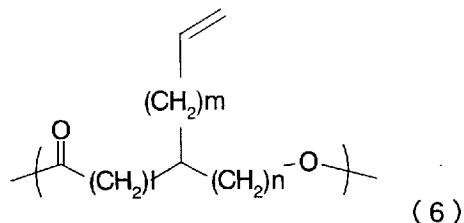
wherein when two or more units are present, R_{4h} , R_{4i} , R_{4j} , R_{4k} , R_{4l} , R_{4m} , R_{4n} , R_{4o} , R_{4ol} , R_{4p} , and l , m and n ~~mean as above~~ are independently selected for everyeach unit.

3. (Withdrawn) A polyhydroxyalkanoate characterized in that the polyhydroxyalkanoate comprises one or more units represented by the chemical formula (5) in a molecule:



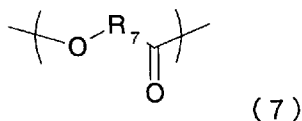
wherein R_5 is hydrogen, a salt forming group or R_{5a} ; R_{5a} is a linear or branched alkyl group having 1 to 12 carbon atoms, an aralkyl group or a substituent having a saccharide; l is an integer selected from 1 to 4, n is an integer selected from 1 to 4, m is an integer selected from 0 to 8; and when l is 1, 3 and 4, n is an integer selected from 1 to 4, and m is an integer selected from 0 to 8; and when l is 2 and n is 1, 3 and 4, m is an integer selected from 0 to 8; and when l is 2 and n is 2, m is an integer selected from 1 to 8; and when l is 2, n is 2 and m is 0, R_{5a} is a substituent having a saccharide; and when two or more units are present, R_5 , R_{5a} , and l , m and n mean as above independently for every unit.

4. (Withdrawn) A polyhydroxyalkanoate characterized in that the polyhydroxyalkanoate comprises one or more units represented by the chemical formula (6) in a molecule:



wherein l is an integer selected from 1 to 4, n is an integer selected from 1 to 4, and m is an integer selected from 0 to 8; and when two or more units are present, l, m, and n mean as above independently for every unit.

5. (Currently Amended) The polyhydroxyalkanoate according to ~~any one of claims 1 to 4~~ characterized in that the polyhydroxyalkanoate claim 1 or 2, further ~~comprises~~ comprising one or more units represented by the chemical formula (7) in a molecule:

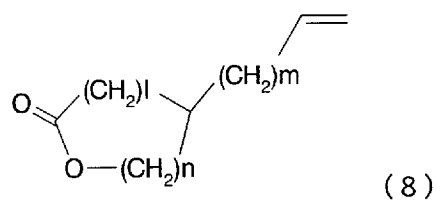


wherein R₇ is a linear or branched alkylene group having 1 to 11 carbon atoms, an alkyleneoxyalkylene group, wherein each alkylene group is independently an

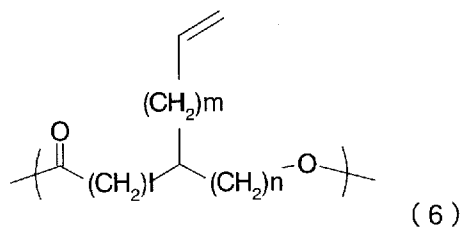
alkylene group having 1 to 2 carbon atoms, respectively, or an alkylidene group having 1 to 5 carbon atoms, which may be substituted with aryl; and

wherein when two or more units are present, R_7 ~~means as above~~ is independently selected for ~~every~~ each unit.

6. (Withdrawn) A production method of polyhydroxyalkanoate represented by the chemical formula (6) characterized in that the method comprises a step of polymerizing a compound represented by the chemical formula (8) in the presence of a catalyst



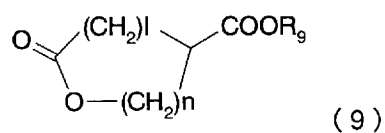
wherein l is an integer selected from 1 to 4, n is an integer selected from 1 to 4, and m is an integer selected from 0 to 8



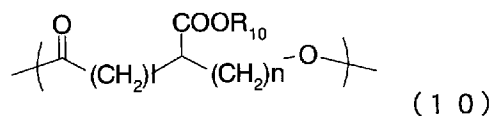
wherein l is an integer selected from 1 to 4, n is an integer selected from 1 to

4, and m is an integer selected from 0 to 8; and when two or more units are present, l, m and n mean as above independently for every unit.

7. (Withdrawn) A production method of polyhydroxyalkanoate represented by the chemical formula (10) characterized in that the method comprises a step of polymerizing a compound represented by the chemical formula (9) in the presence of a catalyst



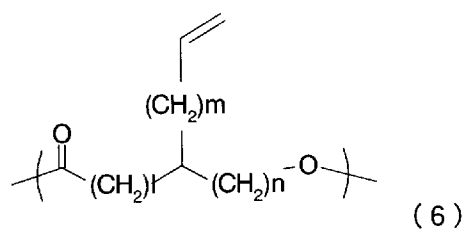
wherein R₉ is a substituent selected from a linear or branched alkyl group having 1 to 12 carbon atoms or an aralkyl group; l is an integer selected from 1 to 4, n is an integer selected from 1 to 4, and when l is 1, 3 or 4, n is an integer selected from 1 to 4, and when l is 2, n is 1, 3 or 4



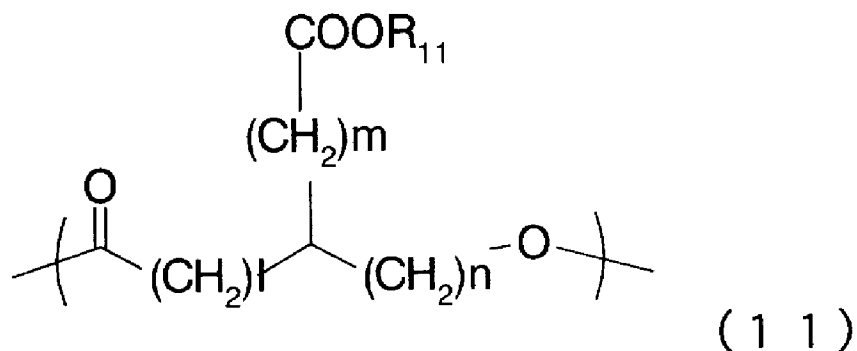
wherein R₁₀ is a linear or branched alkyl group having 1 to 12 carbon atoms or an aralkyl group; l is an integer selected from 1 to 4, n is an integer selected from 1 to 4, and when l is 1, 3 or 4, n is an integer selected from 1 to 4, and when l is 2, n is 1, 3 or 4;

and when two or more units are present, l, n and R₁₀ mean as above independently for every unit.

8. (Withdrawn) A production method of polyhydroxyalkanoate containing a unit represented by the chemical formula (11) characterized in that the method comprises a step of oxidizing a double bond portion of polyhydroxyalkanoate containing a unit represented by the chemical formula (6):

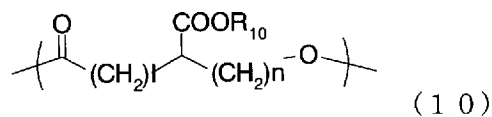


wherein l is an integer selected from 1 to 4, n is an integer selected from 1 to 4, and m is an integer selected from 0 to 8; and when two or more units are present, l, m and n mean as above independently for every unit

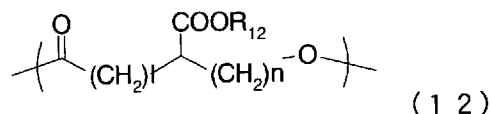


wherein R_{11} is hydrogen or a salt forming group; l is an integer selected from 1 to 4, n is an integer selected from 1 to 4, and m is an integer selected from 0 to 8; and when two or more units are present, l , m , n and R_{11} mean as above independently for every unit.

9. (Withdrawn) A production method of polyhydroxyalkanoate containing a unit represented by the chemical formula (12) characterized in that the method comprises a step of hydrolyzing a polyhydroxyalkanoate containing a unit represented by the chemical formula (10) in the presence of acid or alkali, or subjecting a polyhydroxyalkanoate containing a unit represented by the chemical formula (10) to hydrocracking including catalytic reduction:



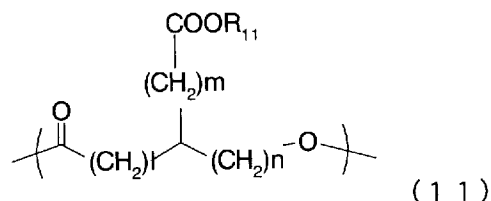
wherein R₁₀ is a substituent selected from a linear or branched alkyl group having 1 to 12 carbon atoms or an aralkyl group; l is an integer selected from 1 to 4, n is an integer selected from 1 to 4, and when l is 1, 3 or 4, n is an integer selected from 1 to 4, and when l is 2, n is 1, 3 or 4; and when two or more units are present, l, n and R₁₀ mean as above independently for every unit



wherein R₁₂ is hydrogen or a salt forming group; l is an integer selected from 1 to 4, n is an integer selected from 1 to 4, and when l is 1, 3, and 4, n is an integer selected from 1 to 4, and when l is 2, n is 1, 3, and 4; and when two or more units are present, l, n and R₁₂ mean as above independently for every unit.

10. (Currently Amended) A ~~production~~ method of producing a polyhydroxyalkanoate containing a unit represented by ~~the~~ chemical formula (1), ~~characterized in that the method comprises~~ comprising a step of subjecting a polyhydroxyalkanoate containing a unit represented by ~~the~~ chemical formula (11) and at

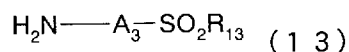
least one amine compound represented by ~~the~~ chemical formula (13) to a condensation reaction:



wherein R_{11} is hydrogen or a salt forming group;

wherein l is an integer selected from 1 to 4, n is an integer selected from 1 to 4, and m is an integer selected from 0 to 8; and

wherein when two or more units are present, l , m , n and R_{11} ~~mean as~~
~~above~~ are independently selected for every each unit;

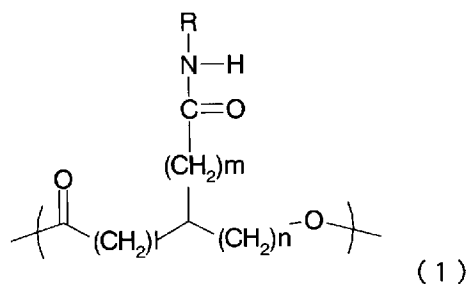


wherein R_{13} is selected from the group consisting of OH, a halogen atom, ONa, OK and OR_{13a} ;

wherein R_{13a} and A_3 are independently selected from a group having a substituted or unsubstituted aliphatic hydrocarbon structure, a substituted or unsubstituted aromatic ring structure or a substituted or unsubstituted heterocyclic structure, respectively; and

wherein when two or more units are present, R_{13} , R_{13a} and A_3 ~~mean as~~

~~above~~are independently selected for ~~every~~each unit;



wherein R represents $-\text{A}_1-\text{SO}_2\text{R}_1$;

wherein R_1 is selected from the group consisting of OH, a halogen atom, ONa, OK and OR_{1a} ;

wherein R_{1a} and A_1 independently represent a group having a substituted or unsubstituted aliphatic hydrocarbon structure, a substituted or unsubstituted aromatic ring structure or a substituted or unsubstituted heterocyclic structure, respectively;

wherein l is an integer selected from 1 to 4, n is an integer selected from 1 to 4, and m is an integer selected from 0 to 8; and

wherein when two or more units are present, R, R_1 , R_{1a} , A_1 , and l, m and n ~~mean as above~~are independently selected for ~~every~~each unit.